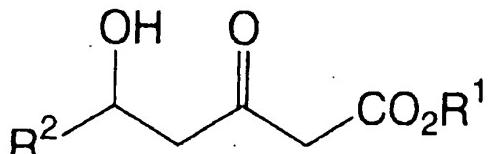


CLAIMS

1. A process for producing a 5-hydroxy-3-oxopentanoic acid derivative of the following formula (IV):

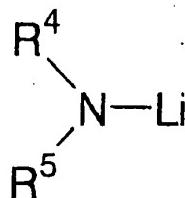
5

(IV)

wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R² represents any of hydrogen, an

- 10 alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group
15 and an alkoxy carbonyl group,

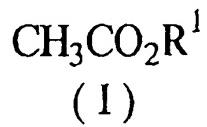
which comprises permitting a lithium amide of the following formula (III):



(III)

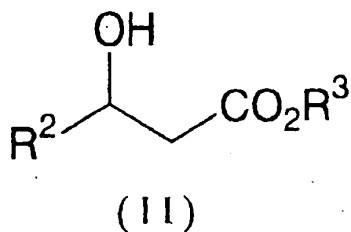
- 20 wherein R⁴ and R⁵ may be the same or different and each represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms, an aralkyl group of 7 to 12 carbon atoms and a silyl group,

to act upon a mixture of an acetic acid ester of the following formula (I) and a 3-hydroxypropionic acid derivative of the following formula (II) at a temperature not below -20 °C:



5

wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms:



wherein R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an 15 aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxy carbonyl group; R³ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R² and R³ may be joined to each other 20 to form a ring.

2. The process according to Claim 1

wherein, referring to the lithium amide, R⁴ and R⁵ each represents an isopropyl group.

25

3. The process according to Claim 1 ~~or 2~~
wherein, referring to the acetic acid ester, R¹

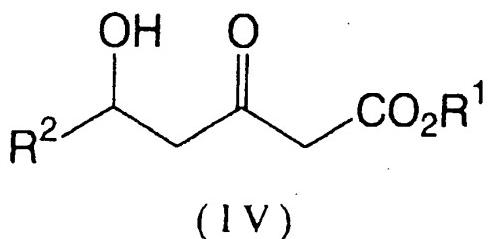
represents a tert-butyl group.

a 4. The process according to Claim 1, ~~2 or 3~~
wherein a magnesium halide is added in permitting the
5 lithium amide to act.

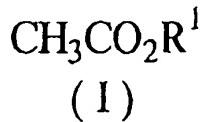
5. The process according to Claim 4
wherein magnesium chloride is used as the magnesium
halide.

10

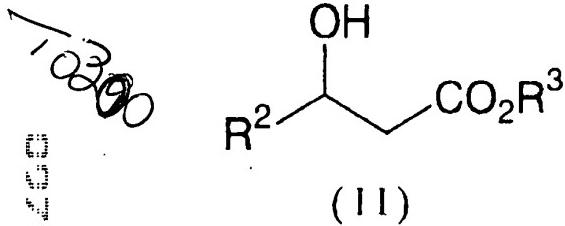
6. A process for producing a 5-hydroxy-3-oxopentanoic acid derivative of the following formula (IV):



15 wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxy carbonyl group,
20 which comprises treating a mixture of an acetic acid ester of the following formula (I) and a 3-hydroxypropionic acid derivative of the following formula (II):
25



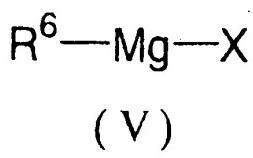
wherein R^1 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms:



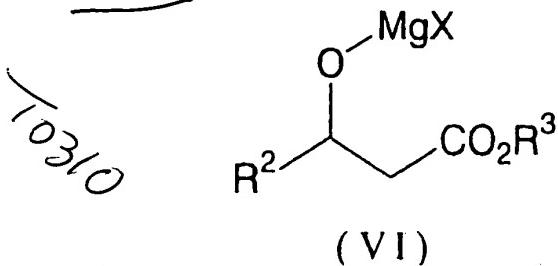
wherein R^2 represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl

- 10 group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxy carbonyl group; R^3 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of
15 7 to 12 carbon atoms; and R^2 and R^3 may be joined to each other to form a ring,

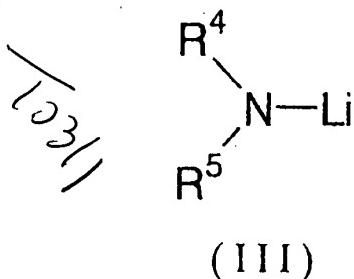
with a Grignard reagent of the following formula (V):



- 20 wherein R^6 represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and X represents halogen, to prepare a mixture of a compound of the following formula (VI) and an acetic acid ester of the above formula (I):



wherein R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxy carbonyl group; R³ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; R² and R³ may be joined to each other to form a ring; and X represents a halogen atom,
 and permitting a lithium amide of the following formula (III):
15



wherein R⁴ and R⁵ may be the same or different and each represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms, an aralkyl group of 7 to 12 carbon atoms
20 and a silyl group
 to act upon the mixture at a temperature not below -20 °C.

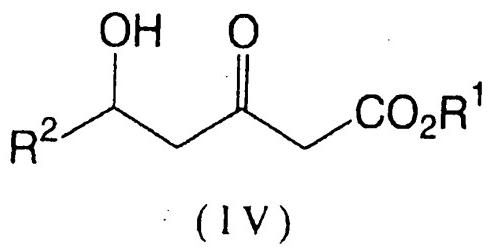
7. The process according to Claim 6

wherein, referring to the lithium amide, R⁴ and R⁵ each is an isopropyl group.

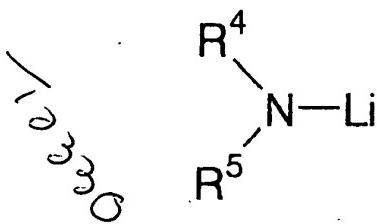
a 8. The process according to Claim 6 or 7
 5 wherein, referring to the acetic acid ester, R¹ represents a tert-butyl group.

a 9. The process according to Claim 6, 7 or 8
 wherein, referring to the Grignard reagent, R⁶ represents
 10 a tert-butyl group and X represents a chlorine atom.

10. A process for producing a 5-hydroxy-3-oxopentanoic acid derivative of the following formula (IV):



15 wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; and R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent,
 20 an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an aralkyl group of 7 to 12 carbon atoms which may have a substituent, a cyano group, a carboxyl group and an alkoxy carbonyl group,
 25 which comprises permitting a lithium amide of the following formula (III):



(III)

wherein R⁴ and R⁵ may be the same or different and each represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms, an aralkyl group of 7 to 12 carbon atoms
 5 and a silyl group,

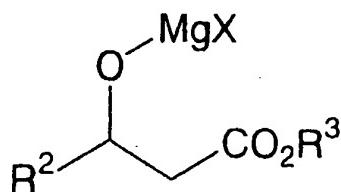
to act upon a mixture of an acetic acid ester of the following formula (I) and a compound of the following formula (VI) at a temperature not below -20 °C:



(I)

10

wherein R¹ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms:



(VI)

15

wherein R² represents any of hydrogen, an alkyl group of 1 to 12 carbon atoms which may have a substituent, an alkenyl group of 2 to 12 carbon atoms which may have a substituent, an aryl group of 6 to 12 carbon atoms which may have a substituent, an
 20 aralkyl group of 7 to 12 carbon atoms which may have a substituent,

a cyano group, a carboxyl group and an alkoxy carbonyl group; R³ represents any of an alkyl group of 1 to 12 carbon atoms, an aryl group of 6 to 12 carbon atoms and an aralkyl group of 7 to 12 carbon atoms; R² and R³ may be joined to each other to form a ring; and X represents a halogen atom.

11. The process according to Claim 10
wherein, referring to the lithium amide, R⁴ and R⁵ each represents an isopropyl group.

10

a 12. The process according to Claim 10 ~~or 11~~
wherein, referring to the acetic acid ester, R¹ represents a tert-butyl group.

15

a 13. The process according to Claim 10, ~~11 or 12~~
wherein, referring to the compound (VI), X represents a chlorine atom.

20

a 14. The process according to any of Claims 1 to 13
wherein R³ is a methyl group or an ethyl group.

25

a 15. The process according to any of Claims 1 to 14
wherein R² is a chloromethyl group, a cyanomethyl group or a benzyloxymethyl group.

30

a 16. The process according to any of Claims 1 to 13
wherein R² and R³ are joined to each other to form a methylene group.

a

17. The process according to any of Claims 1 to 16
wherein the compound (II) or (VI) is optically active.

Pack A1